

it, but the only true testing must be left to investigators of the future, for it is to be feared that in the past seismologists have been inclined to reject, as bad, all records of time which failed to fit in with their preconceived ideas of the direction of propagation of the shock, though they might have fitted in with a less simple, though possibly truer, conception of the form and extent of the earthquake origin.

R. D. OLDHAM.

CURRENTS IN THE STRAITS OF MESSINA.

FOR our knowledge of the physical conditions at the bottom of the sea we are very largely beholden to the enterprise of submarine cable companies; indeed, it is difficult to imagine a more thoroughly satisfactory method of survey than that employed by them. Duties connected with the maintenance of cables have led to the discovery of details in the configuration of submarine gullies, of fresh-water outlets beneath the sea, and of alterations in the bed of the ocean itself, which would otherwise have eluded observation. Prof. Platania, of the Istituto Nautico di Catania, has directed attention to another rather surprising fact, namely, that in the Straits of Messina there are deep-water currents of sufficient velocity to cause the interruption of the cables joining Sicily with the mainland ("I cavi telegrafici e le correnti sottomarine nello stretto di Messina," reprinted from the *Atti della R. Accademia Peloritana*, vol. xx.). The period under observation covers the last forty years, during which time there have been twenty-six interruptions; neglecting two, nineteen occurred between November and April, and five between May and October. The strong currents cause a continual attrition by sand and pebbles. The rocks on the sea bottom are swept free of mud and sand, and their rough surfaces, thus exposed, have worn out the cables lying upon them. In one case a cable seems to have been corroded by a sulphurous spring. The surface currents attain a speed of five miles an hour. They have always been a danger to navigation, and the wrecks of two large vessels which were lying last summer upon the Sicilian shore show that Scylla and Charybdis have lost none of their power. The existence of correlated strong deep-water currents had been suspected. Biologists have long been attracted to Messina by the plentiful harvest of deep-sea animals which are occasionally brought up to the surface by a vast turmoil of waters, thus affording almost unique opportunities. M. Thoulet and others have repeated the classical experiments of our countryman, Captain Richard Bolland, made in 1675 in the Straits of Gibraltar, and have demonstrated the existence, at twenty fathoms, of an undercurrent flowing in a contrary direction to that on the surface, but these currents have not yet been as systematically studied as the importance of the subject demands. The tides, as is frequently the case in narrow straits, as, for instance, inside the Isle of Wight, are doubled.

A PERIODICAL FOR PALÆONTOLOGISTS.

THIS new venture in scientific literature,¹ which is to appear quarterly, and leads off with a double number, will be warmly welcomed by all palæontologists, for since the "*Annales des Sciences Géologiques*" ceased to exist, there has been no accredited journal for palæontology in France. The "*Annales des Sciences Naturelles: Zoologie*," it is true, has on occasion offered the hospitality of its pages, but the whole of its space is not too great for the living subject.

Material enough and to spare lies ready to hand at the Paris Museum in collections from all parts of France and its colonies, while it is further intended to carry on D'Orbigny's incompleted tasks begun in his "*Paleontologie Française*" and "*Prodrome de Paléontologie stratigraphique universelle*." The publication of illustrations of the yet unfigured types of the latter work, with reprints of the author's diagnoses, accompanied by notes and ex-

¹ "*Annales de Paléontologie*, publiées sous la direction de Marcellin Boule." Tome i. fasc. 1 and 2, January, 1905. Pp. xi+100; 9 plates. (Paris: Masson et Cie.)

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planations, an undertaking of great merit, is begun in this first part.

As regards guiding principles, the editor, while not wishing in any way to dictate to his contributors, gently suggests in his introduction that he has preferences. On the one hand, he seeks memoirs on stratigraphical or purely systematic palæontology, in which the principal object will not be the multiplication of genera and species, holding as he does that *mieux valent des choses sans noms que des noms sans choses*. On the other, he inclines to papers having a philosophic bearing.

With his former predilection all must be in accord, while of the latter, the very first paper, one by the veteran Albert Gaudry, "*Fossiles de Patagonie. Les attitudes de quelques Animaux*," is an excellent example, where "*attitudes*" is used to express the comparative bearing, gait, and appearance, and not posture alone. The author points out that in Tertiary times in Patagonia Plantigrades and Rectigrades predominated over Digitigrades.

The editor and M. A. Thevenin give the first instalment of a series of memoirs on the palæontology of Madagascar, in which they deal with the molluscan fauna from newly discovered Upper Cretaceous beds on the eastern side of the island. Some of the species enumerated are identical with those found by the Rev. R. Baron in the northern and north-western districts, that were described by Mr. R. B. Newton in the *Quart. Journ. Geol. Soc.* for 1889 and 1895, a fact to which, however, allusion is not made. This fauna presents considerable analogy with that which lived during the same epoch in India.

The second contribution to the same series, by M. Douville, treats of some nummulitic beds in Madagascar.

M. Boule adds a memoir on "*Les grands Chats des Cavernes*," principally the lion, that takes the form of a popular review of current knowledge on the subject.

The part concludes with the opening portion of the descriptions and figures of D'Orbigny's types already referred to.

Altogether there are 100 pages of text, with nine phototype plates, besides abundant illustrations in the text, all the figures being most excellent, and veritable works of art.

There is, indeed, but one objection to raise, and that is against the adoption of dual pagination, each paper having its distinct pagination in addition to that of the volume, because the disadvantages of this system for purposes of citation far outweigh any possible benefits.

It is to be hoped that the glossy surfaced paper selected, so suitable for modern text illustrations, though not for type of the face employed, is not of that perishable description which we have been lately warned will deprive future generations of the fruits of our intellectual labours.

B. B. W.

UNIVERSITY AND EDUCATIONAL INTELLIGENCE.

CAMBRIDGE.—The special board for mathematics has put forward new proposals, both with regard to the mathematical tripos and the mechanical sciences tripos, which involve far-reaching changes. The first-named report points out that in the opinion of the special board the existing mathematical tripos is unsatisfactory as an examination. The special board proposes to substitute for the present part i. a new part i., which may be taken by a student either at the end of his first or second year. Part i. will not qualify for a degree without further examination. It is hoped that this part will be taken by many who propose to proceed later to study engineering or natural sciences. The board further proposes that for the existing part ii. a new part ii. be established, which must be taken at the end of the third year. The position of senior wrangler is abolished, but the class list of each part will contain three classes, the names in each class being arranged alphabetically. Schedules are published for each of the proposed new parts.

With regard to the report of the mechanical sciences tripos, the special board of mathematics suggests that part ii. of the tripos should be abolished, and it is proposed to modify part i. by the inclusion of a number of

papers on questions of greater difficulty or of wider range than the average of those now set. The other papers of this part are, however, to be made easier than the present average. The board hopes to include a paper on chemistry in the future. It is also considered to be desirable that the examiners should be empowered to take into consideration the laboratory and drawing-office work done by the student during his course; but perhaps the most important of the recommendations is that every candidate for the mechanical sciences tripos, unless he has obtained honours in one of the honours examinations of the University, must pass a qualifying examination in elementary mathematics and mechanics, which will be held twice a year.

The special board for biology and geology has nominated Mr. F. A. Potts, of Trinity Hall, to use the University table at Naples for four months from April 1. Applications for the use of this table and for that at the Marine Biological Association's laboratory at Plymouth should be sent in to the chairman of the special board (Prof. Langley) on or before May 24.

Dr. Haddon is giving a special course of lectures on magic and savage religion on Mondays during this term.

PROF. FRIEDRICH CZAPEK, of the Prague Technical High School, has been appointed professor of botany in Czernowitz University. Prof. Armin Tschermak, of the University of Halle, has been appointed professor of physiology and medical physics in the Veterinary High School, Vienna.

It is announced by *Science* that Adelbert College, Western Reserve University, has received 30,000*l.* from the grandchildren of Mr. Joseph Perkins, formerly a trustee of the college. The money is to be used for a department of sociology and a chemical laboratory.

On Commemoration Day at Glasgow University on April 18 the honorary degree of Doctor of Laws was conferred upon Mr. James S. Dixon, founder of the lectureship of mining in the University, and Mr. R. E. Froude, superintendent of the Admiralty experimental works at Haslar.

ALTHOUGH we are far behind other nations in governmental recognition of the claims of anthropology, the universities, the older ones leading the way, are following their Continental sisters in making it a subject of systematic study by providing courses of instruction and establishing diplomas and other distinctions. The Oxford committee for anthropology has just issued the regulations for the diploma and the list of lectures for the next two terms. It is pointed out by the committee that not only members of the university, especially those whose work will bring them in contact with native tribes, will benefit from the newly-established course of study, but also those already in contact with native races who feel the need of extending their anthropological knowledge during their "long leave." The schedule of lectures shows that although no provision can yet be made for systematic instruction covering the whole of the very wide field in even a summary manner, students who present themselves are sure of finding helpful and stimulating teaching in all the more important branches of the subject: the chief omission at present is the failure to include social organisation, usually a crux for missionaries and the untrained generally, among subjects on which aid may be sought. The secretary of the committee is Mr. J. L. Myres, Christ Church, from whom all information may be obtained.

SOCIETIES AND ACADEMIES.

LONDON.

Royal Society, February 1.—"A Further Communication on the Specificity and Action *in vitro* of Gastrotoxin." By Dr. Charles **Bolton**.

An analysis in the test-tube of the gastric cytotoxin obtained by injecting the rabbit with guinea-pig's stomach cells has shown that it is a complex body. After a single injection there is a great increase in the hæmolysin normally occurring in the rabbit's blood, and after further injections an artificial hæmolysin makes its appearance. The artificial hæmolysin is distinguished from the natural hæmolysin, because the former can be complemented by guinea-pig's normal blood serum, whereas the latter cannot.

There is also present in the immune serum a substance which agglutinates the red blood corpuscles. Closely associated with the appearance of this artificial hæmolytic immune body is that of an agglutinin which acts upon the gastric granules, and also that of a precipitin which acts upon the soluble proteids of the gastric cells. By repeating the injections these substances are found to be present in the blood for several months. Whether they are one and the same or distinct bodies has not yet been proved. After several injections, and not less than about five weeks from the first, a further substance appears in the blood, which possesses an action upon the intact gastric cells. In spite of repeated injections this substance disappears from the blood in about four months. It is probably of the same nature as a hæmolysin, but this point requires proof.

The hæmolytic factor is only active against blood. The actions of the agglutinin and precipitin are not confined to the constituents of the gastric cells, but extend to other proteids of the body. Whether there are separate agglutinins and precipitins for different proteids, or whether the same substances act upon all proteids, has not been determined; at all events, if the same bodies are concerned in all cases, their action upon the proteids of the stomach cells is probably greater than that upon other proteids. Whether the gastrolysin itself is truly specific remains to be proved.

The few experiments that have been undertaken in the case of the human stomach indicate that the human gastric cytotoxin is identical in constitution with that of the lower animals.

February 8.—"Explosions of Coal-gas and Air." By Prof. Bertram **Hopkinson**.

The explosion of homogeneous mixtures of coal-gas and air at atmospheric pressure and temperature is investigated by means of platinum resistance thermometers placed at various points in the explosion vessel. The vessel is of dumpy cylindrical form and 6.2 cubic feet capacity, and the mixture is fired by an electric spark at the centre. Each thermometer consists of a loop of bare platinum wire about 5 centimetres long and 1/1000th inch diameter, which is placed in series with a battery of constant potential and a reflecting galvanometer, of short periodic time, the deflection of which is recorded photographically on a revolving drum. On the same drum the pressure of the gas is recorded. The arrival of the flame at any wire is marked by a sharp rise in its resistance, and the rate of rise, when corrected for the time lag of the wire, gives a measure of the velocity with which the gases about it combine. It is found that with a mixture consisting of one volume of gas and nine of air the flame spreads from the spark in a somewhat irregular manner, but at a rate of roughly 150 centimetres per second. A thermometer placed near the spark shows a sudden rise of temperature to about 1200° C., after which the temperature remains nearly constant until the flame approaches the walls of the vessel. With the rapid rise of pressure which then occurs the adiabatic compression of the burned gas at the centre causes the temperature there to rise to about 1900° C., with the result that the wire of the thermometer generally melts. At a point near the walls the gas is compressed to near the maximum pressure before ignition, and the temperature consequently rises suddenly to 1200° C. or 1300° C., and as there is little subsequent compression there is not much further rise of temperature. Thus, in consequence of the different treatment of the gas at different points in the vessel, differences of temperature of 500° C. exist in the gas at maximum pressure after an explosion of this kind. That such differences must necessarily exist after an explosion even in a vessel impervious to heat does not appear to have been noticed hitherto. These differences are rapidly obliterated by convection currents, but their magnitude at the moment of maximum pressure is such as to make it impossible to obtain an accurate estimate of the specific heat from the pressure record after the manner of Messrs. Mallard and Le Châtelier. The work of these experimenters is not, however, open to the chief objection that has hitherto been urged against it, viz. that combustion was incomplete when they measured the specific heat. The experiments here described show that the combustion at any point is prac-